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Jahn-Teller induced nematic orbital order in tetragonal Sr2VO4

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Abstract

© 2016 American Physical Society.Using high resolution x-ray diffraction (XRD) on high purity powders, we resolved the structure and ab symmetry of the intriguing compound Sr2VO4 from room temperature down to 20 K to an unprecedented level of accuracy. Upon cooling, this set of data unambiguously reveals a second-order phase transition lowering the symmetry from tetragonal to orthorhombic at a temperature Tc2=136 K. The observation of an orthorhombic distortion of the ab plane is attributed to nematic phase formation supported by local Jahn-Teller (JT) dynamical instability. At TN=105 K, spins order and at Tc1=100 K the tetragonal structure is recovered with an elongated c axis.

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